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ABSTRACT

Various attempts have been made in the past to improve the quality of American education by individualizing instruction. The most common method of individualizing instruction has been by varying the rate of progress or the type of assignment. Perhaps a more important and little used method is that of adapting education to individual differences with respect to the goals of the educational program. An effective program for individualizing instruction must be based on extensive additional psychological research and development in (1) formulating the functions of an educational system, (2) achieving the individual's educational goals, (3) monitoring the individual's progress, (4) formulating goals and planning individual development, and (5) preparing the teacher for individualizing education. Using the knowledge now available, a program known as Project PLAN (Program for Learning in Accordance with Needs) is being developed and tested. Project PLAN attempts not only to utilize knowledge about the learning process itself and about instructional materials, but also to help the individual student to know his strengths and weaknesses and, with the help of guidance and counseling, to select his educational objectives. A list of references is appended. (JY)

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INDIVIDUALIZING EDUCATION*

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In the early 1900's Thorndike (1907) and other American educational psychologists (Ayres, 1909) studied what was happening to students entering American public schools. They found that, of those entering the first grade, less than 10% completed high school. Many students were held back year after year because of their failure to attain the high standards set by the classical curriculum. About this time a series of research studies designed to test the theory of mental faculties and the doctrine of mental discipline was carried out by Thorndike and Woodworth (1901). The important research programs that followed, provided a wide variety of new courses for the public schools. These course changes plus other factors during the past 50 years have made it possible for more than 70% of the students entering the first grade to graduate from high school.

The change from 10% to 70% certainly represents progress. However, in today's affluent society, 70% is definitely not good enough. America's educational program must be improved for the 30% who are now drop-outs and also for the middle 40% who are in many cases getting a watered-down college preparatory course rather than the types of education which would be of most value to them.

A major failure of American education is that many of our students are being taught the wrong things. Another deficiency shown by the recent Project TALENT survey (1964) is that the present instructional programs are not enabling students to achieve the levels in reading comprehension that are essential for effective participation in a democracy. For example,

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only 7% of ninth grade students and 25% of twelfth grade students were able to answer correctly half of the questions based on typical paragraphs discussing national issues in Time Magazine. These results suggest that today's high school graduates are ill-equipped to evaluate the evidence and make wise decisions and choices with respect to important national issues.

That some of this failure to develop skill in reading comprehension is due to the assignment of inappropriate material is suggested by the fact that about 34% of both the boys and the girls in the twelfth grade stated (Flanagan, Dailey, Davis, Goldberg, Neyman, Orr, & Shaycoft, 1964) that about half the time or more frequently "I read material over and over again without really understanding what I have read."

Psychologists, by applying the methods of science and technology, can assist the nation in taking a major step in the improvement of the educational system. In 1967, while he was Secretary of Health, Education, and Welfare, a very distinguished psychologist, John W. Gardner (1967), stated that one of the major tasks facing our society is that: "We must redouble our efforts to create an educational system that will provide the maximum individual fulfillment for each American (p. 39)."

In the discussion of ways to improve education, there is frequent reference to individualizing instruction. To quote from a few experts:

"The desirability of individualizing instruction is no longer questioned by anyone. The objections to it are concerned chiefly with the application of the theory to classroom conditions. Among the many partial solutions offered to the problem is that of differentiated requirements, or the practice of varying the amount of work to be accomplished in accordance with the ability of the individual pupils of a group. While differentiating requirements makes possible a high degree of individualization, its successful administration in the classroom presupposes on the part of the teacher (1) knowledge of the educational status of his pupils as individuals, (2) organization of the materials of instruction so as to permit flexible assignments, and (3) the adoption of a technique of instruction which will enable the teacher to use a large share of his teaching time in directing work rather than hearing lessons.

"The classroom then becomes a workshop in which the instructor is the director ... individuals advance at their own rate and the instructor assigns to each the amount of assimilative material which in his judgment is needed to insure the understanding desired."

Or, to quote another expert in the same publication,

"Under the old regime in the effort to give different children the same subject matter in the same length of time, the quality of the children's work, the degree of their mastery, varied from poor to excellent, as attested by their report cards. But under the new technique of individual education, instead of quality varying, time varies: a child may take as much time as he needs to master a unit of work, but master it he must. The common essentials, by definition, are those knowledges and skills needed by everyone. To allow many children, therefore, to pass through school with hazy and inadequate grasp of them, as one must under the class lock-step scheme, is to fail in one of the functions of the school."

These quotes may have a contemporary ring but they are statements made by Reavis (p. 49, 1925) of the University of Chicago High School and Washburne (p. 79, 1925) of the Winnetka Public Schools in the 1925 Yearbook of the National Society for the Study of Education entitled, Adapting the Schools to Individual Differences. The same yearbook describes how San Francisco State College installed in 1913 what was then called "the individual system" of Burk. This system was used with all 700 children in the training school.

In the 1962 Yearbook of the same group entitled, Individualizing Instruction, Wilhelms (1962) of San Francisco State College says, analysis of various systems including the Winnetka plan,

". . . reveals a disappointing amount of true individualization. In both schemes there has been far too much tendency to individualize with respect to little more than rate of progress. . . . And one must have a meager conception of individualization to settle for students merely being able to do these same things at a different pace. Such 'individualization'

largely fails to come to grips with the fundamental differences among students - differences in their interests and purposes, their personal needs, and their whole modes of thinking and learning (p. 65)."

Thus, in the 1960's, as 50 years ago, educational leaders see a very great need for the individualization of instruction because of individual differences among our students. Many groups are giving thought at the present time to how education can be improved. An excellent statement has just been published by the Committee for Economic Development (1968) under the title, Innovation in Education: New Directions for the American School. In a recently published discussion, Carter (1968) presented seven points drawn from a variety of studies and experiences, relating to using knowledge in attacking major contemporary problems. In a recent paper Flanagan (1967) presented 11 points on using research and development to improve education. All of these discussions emphasize the need for extensive research, experiment, development, and evaluation in education. They emphasize the importance of evaluation, both in a formative and summative sense. They also emphasize the importance of a comprehensive program as contrasted with fragmentary, small local efforts.

What efforts have been made in the last 50 years to adapt education to individual differences and what are the important considerations educational psychologists must keep in mind in approaching this problem? To adapt for individual differences, four aspects of the educational program have been varied. Perhaps the most common type of adaptation to individual differences has been in terms of differentiated assignments. Students have been asked to read different books, to write about topics of their own choosing and related to their own interests, and to do projects and papers related to their specific abilities and interests. These types of differentiated assignments, under the name of enrichment or adaptation, have been the hallmark of the master teacher for many years. The second type of adaptation to individual differences is with respect to rate of learning. Although the recent surveys of Goodlad and Anderson (1964) suggest that this is not as prevalent as the

frequency of reference to ungraded schools might suggest, it is clearly the next most popular way of handling individual differences. The third procedure for varying instruction is in terms of methods and media.

In the past, these types of adaptation have been mainly confined to the primary levels to help children learn to read and to acquire the other fundamental skills. Teachers have varied their approach to fit the particular child's needs. Although teachers have done a good deal of improvising and adapting, there is almost no adequately verified knowledge regarding the matching of methods, media and materials to learning styles, but many psychologists and educators are convinced that research in this area will be very rewarding in improving the efficiency of instruction.

The last and most important of the methods of adapting education to individual differences is with respect to the goals of the educational program. In the typical elementary school today there is very little variation in goals. The secondary schools, by offering a choice of courses and a choice of electives, are providing some opportunity for variation of this type. However, there is a definite need for more flexibility and more adaptation of the educational program to the goals of the individual at both the elementary and the secondary level.

Before proceeding to a discussion of the problems and research opportunities confronting educational psychologists it is important to make a distinction between the title of this paper, "individualizing education," and the more commonly used term "individualizing instruction." The distinction made here is that a program of instruction is one which imparts knowledge and skills with respect to specific well-defined goals. A program of education includes, in addition to instruction, assisting the student to become acquainted with the many opportunities, roles and activities which life offers and assisting the student to gradually develop convictions as to the relation of his own unique talents, interests, and values to these possible roles. In simpler terms, individualized education includes guidance and individual planning. Individualized instruction does not include such a formulation of goals and plans.

An effective program for individualizing education must be based on extensive additional psychological research and development work in at least five areas. In the discussion which follows, it will become very clear that each of these five areas represents a major challenge to psychologists. The accumulation of verified building blocks in any one area will require not only a number of years, but also a substantial effort in terms of both cost and quality of research and development staff. Only by demonstrating significant progress in each of these five areas can psychologists hope to obtain the type of support essential for carrying out their role with respect to the most important mission facing society today - the education of our young.

Educational Objectives: Formulating the Functions of an Educational System

The topic of educational objectives raises many questions of philosophy and values. However, in present day American society, there is substantial agreement on the general purposes of American education as shown by the reports of many committees and commissions who have studied the functions of the schools in the past several decades. Although each group expresses their educational goals in slightly different terms, the central theme, with great consistency, is the maximum individual fulfillment for each American. See, for example, the statement in Goals for Americans (1960). Included in individual fulfillment is, of necessity, the development of an environment in terms of a social and civic order which will make this possible. Similarly, individual fulfillment can be thought of as having two major components; fulfillment in work or a career, and fulfillment in leisure time, cultural, and recreational pursuits.

It is believed that the educational system of the future should be able to take for granted the satisfaction of such primitive drives as Maslow's (1954) physiological and safety or security requirements. This would make it possible to concentrate on the higher order drives in his hierarchy

including affiliation or close affective relations and achievement and esteem. The desired condition would be to enable each person to focus primarily on his highest level drive, self-actualization, involving the full development of his potential in terms of skills, abilities, and appreciation.

In the complex society of the present day, with the great diversity of individual talents, interests, and values, it is obvious that only by individualizing the goals of education can we hope to achieve full and satisfying lives for each of our citizens.

Granted these desirable general goals for the educational system, how do we determine for a particular child, the nature and sequence of achievement of educational goals which will make it possible for him to obtain individual fulfillment?

Typically, the solution to this problem has been sought in terms of a colossal over-simplification of the nature and scope of the investigation required to provide meaningful statements of educational objectives. The first over-simplification has been to establish only one set of goals for all the nation's children for the elementary schools. For example, the recent goals set for education in Pennsylvania (1965) could be cited. Even at the secondary school level, the number of separate sets of goals which has been established has been very limited. What is needed is a unique set of goals for each individual. Thus from the universe of all educational objectives deemed acceptable by whatever developmental procedure is utilized, one can select a unique set in terms of the educational requirements for each individual. These goals must be formulated in terms of his particular pattern of talents, interests, and values, and the relation of these to the opportunities, roles, and activities for which he wishes to prepare.

The second serious over-simplification in establishing goals is the assumption that a group of ten, twenty, or a hundred adults, even though very wise and experienced, has the necessary background and information to formulate, using their memories and judgment, a comprehensive set of educational objectives to be offered to the students. The most extensive

effort of this type in recent years has been that of the efforts at national assessment under the auspices of the Exploratory Committee on Assessment of Progress in Education (Tyler, 1966). There seems no adequate substitute for wise and experienced committees, but these committees must be supplied with much more detailed information about the skills and abilities possessed by the students at various levels of development, their needs at the next levels, and particularly, the requirements for effective participation in the roles and activities which are likely to be open to them.

There are many ways to collect the detailed information about requirements in terms of knowledge, abilities, and appreciations which are essential for successful performance in specific roles. A leading expert in this field, Ralph W. Tyler (1951) suggests studies of learners, studies of the demands of life outside the school, the views of subject matter scholars and philosophers, and studies of the psychology of learning as sources of the required information. As examples, two types of information-gathering procedures are proposed here. The first of these consists in the collection at several levels, such as fourth grade, eighth grade, and twelfth grade and five years and ten years after graduation, of intensive longitudinal case studies of individual development. It is believed that following these individuals through time with relatively complete information about their initial status and their progress would provide a basis for a much better understanding of the achievements required at a particular level to insure success in the appropriate activities at the next level. Experience has shown (Flanagan, 1966) that it is quite difficult to say what would be the best experience this year for a fourth grade class. It is much easier for competent observers to agree on a specific program for a particular boy, given the detailed facts about his background, abilities, interests, values, and recent experiences. The facts usually point quite clearly to what the school can best do for his development during the next year.

The second type of information to be collected for the committees would be the analysis and summarization of several thousand critical incidents (Flanagan, 1954) on specific behaviors observed by teachers, parents, and other observers. These incidents would involve specific observed behaviors which indicated a particular student deficiency. Here again it has been found that there is little difficulty in getting two observers of a specific behavior on the part of a child to indicate that either this is something which should be encouraged or it is something which should be corrected and improved for the child's effective growth and development. These specific observations would also be of very great value in contributing to the judgments of appropriately established committees. Such committees should include lay citizens, teachers, educational administrators, subject matter specialists, and scholars in philosophy, human learning, and development.

In recent years there has been considerable controversy over the form in which educational objectives should be presented to the teacher and to the student. The recent stress on terminal objectives and specific behavioral objectives (Mager, 1962) has revealed the undue emphasis in current education on trivial aspects of subject fields as compared with objectives more likely to be relevant in the achievement of important goals. There is also little doubt that there is need for caution against accepting the more easily specified objectives as Atkin (1968) and Travers (1968) have noted. Outcomes such as creative originality in art or undesirable, unplanned effects such as the dislike of the field of mathematics, could as easily be overlooked by a zealous curriculum builder bent on "stamping out non-behavioral objectives" as by those who build their curriculum on the basis of broad goals such as these and fail to formulate specific definitions of what is meant by these goals.

The appropriate procedure certainly must include providing as much objectivity, specificity, and relevance as possible in the definition of educational objectives. However, if we cannot specify any set of judgments by any group of persons which will establish that Exhibit A shows more creative originality in art than Exhibit B, it may be just as well for us to drop this as an objective for our Art Department.

A basic skill, such as reading comprehension, which takes many years to develop to a reasonable adult level is much more important than any group of easily specified behavioral objectives. However, there are many who would argue that reading comprehension consists of a very comprehensive and complicated use of an extraordinarily large number of behavioral elements. If these can be identified and taught in such a way as to improve the reading comprehension of our twelfth grade students this will certainly be an important development.

Other long-range objectives are such items as learning how to learn, taking responsibility for learning, and learning to manage one's own learning program.

The effort required to develop a comprehensive set of educational objectives which includes appropriate sub-sets for each of our young people, will be of very great scope. Furthermore, the changing society and technological and scientific advances together with the expected increase in understanding of human learning processes should require that these objectives be in a constant state of revision and modification. The point to be emphasized is that the present stage of development in terms of deriving objectives for individual students is somewhere between pre-primitive and primitive and a very major effort will be required in the next few years to obtain a clear picture of the goals of American education.

Learning Methods and Materials: Achieving the Individual's Educational Goals

Once the objectives have been established, the only criterion for evaluating the quality of instruction is efficiency. This statement, of course, assumes that the list of desired objectives is complete and precise. Both Carroll (1968) and Gagne', as reported by Lange (1968), after acknowledging the serious limitations of our present knowledge regarding the conditions of

learning in the classroom, point out that presently available instructional material does not make use of the many well-established principles of learning. Recent experience suggests that perhaps this discrepancy between well-established psychological knowledge and current instructional materials may not be as important as it might appear.

For example, two teams of psychologists, one headed by Markle, and the other by Short, both of the American Institutes for Research, recently undertook the development of specific instructional programs in which one of the major goals was efficiency in attaining a high level of mastery. In both instances it was found that the major gains in efficiency in the program came not from insights and applications of psychological principles, but from repeated empirical tryouts and feedback as to the effectiveness of the initial attempts to assist the student to learn. The very dramatic improvement obtained in these courses as a result of a series of empirical tryouts emphasizes the great inadequacy of our present knowledge regarding learning. In Markle's study (1967) the procedures of empirical tryout and revision resulted in a program which enabled the least apt student using the new instructional materials and methods to learn as much as the most apt student using the earlier materials. In Short's study (1968), using a somewhat similar procedure, a high level of mastery of all important objectives was obtained in a fraction of the time required by the programs previously in use.

Certainly progress is being made toward understanding classroom learning. Gagné's conditions of learning (1965), Briggs' monographs (1966, 1968) on instructional media and sequencing of instruction, and Carroll's recent article (1968) on learning from being told, appear to point the way toward better understanding of what is happening in the classroom. Another promising approach to understanding the apparent changes in the quality of performance in age-related stages of development as noted by Piaget and others, is Gagné's recent article (1968) proposing that behavioral development results from the cumulative effects of learning

rather than from simple maturation or the acquisition of a basically different ability to deal with logical processes.

In adapting learning methods and materials to a specific individual, the concept of "quality of instruction" can be easily extended to indicate the degree to which the task to be learned is structured or organized in such a way that it is optimally efficient for the specific learner. In discussing this problem, Cronbach (1967) includes four procedures for adapting instruction to individual differences. The first and simplest of these is, given a fixed set of instructional materials, simply vary the time given the student for completion. The second type of adaptation discussed by Cronbach is matching goals to the individual. Cronbach points out a number of limitations and possible dangers of too much emphasis on dropping goals for individuals because of their difficulty in attaining them. The third type of adaptation he mentions is by erasing individual differences. The suggestion here is that if a requisite ability has not been adequately developed that attention be given to the development of the ability prior to initiating work with the instructional materials. The last of the methods mentioned is adaptation to individual differences by altering instructional methods. Such items are discussed as interactions between learning abilities and performance. There is also a discussion of designing alternative treatments to interact with variables which seem likely to show differential results. The final point discussed is adaptation to take advantage of the interaction between such attitudes as willingness to take risks, confidence, and motivation for achievement.

In his discussion of Cronbach's points, Carroll (1967) suggests that psychologists must do a great deal of research before we can be sure that the achievement of all pupils seeking a given educational goal will be optimal and significantly better than if we had used a single best method to teach all of them. Significant findings in the search for individual learning styles have been reported by Beard (1967), Kropp (1967), and

Tallmadge (1968), among others. Because of the very great number of patterns of individual differences, an enormous amount of research needs to be done to even approach being able to prescribe the optimal instructional materials and methods for each student to learn each type of educational objective. The recent surveys by Briggs suggest that sequencing and the selection of the most appropriate media may be of great importance in achieving efficiency in instructional programs.

Evaluation: Monitoring the Individual's Progress

A basic requirement in developing any system of education is to be able to assess its outcomes. Much of the evaluation of school programs done in the past decades has been in terms of the analysis and description of the school's facilities and organization for education. Accreditation of schools and similar types of evaluation have been done in terms of such variables as the assessment of the quality of the educational building, the equipment of the classrooms, the number of books in the library, the pupil/teacher ratio, the amount of training of the teachers, and similar factors. Elaborate systems have been established for conducting this type of evaluation and teams regularly carry on school evaluations of this type throughout the country. It need hardly be added that most of the variables studied have been shown to have no relation to the quality of instruction received by the students.

In recent years, considerable attention has been given to the process of instruction. Observations have been made of teacher behaviors and student behaviors in classrooms. These have been classified, and more recently, studies have been made of the relation of various types of teacher behaviors to student learning. Certainly the study of process is important in education and work along this line will be discussed more fully in a later section on teacher development.

The trend at the present time is very strongly in the direction of evaluating the product of education in terms of the preparation and development of students. Most of the present evaluation programs suffer from two serious defects. First, only a limited number of the basic skills and types of knowledge included in the educational program are sampled in the testing programs. Second, there is a tendancy to give all students all of the various measures whether they are relevant to that particular student's developmental program or not.

An effective program for evaluating the effectiveness of the education provided an individual must be very comprehensive in scope so as to include all of the objectives planned by this student. The student must receive detailed feedback regarding the success of his learning activities in the past week or two. Periodically there must be measures of his progress with respect to such long-range abilities as reading comprehension, vocabulary knowledge, and problem-solving. It is especially important that the assessment procedures for the more important long-range objectives include estimates of progress with respect to such very important, but very difficult to measure objectives, as originality, effectiveness of written expression, and various attitudes and appreciations. It is also important that the comprehensive assessment program include provisions for evaluating the presence of any unplanned effects resulting from the educational program of either a desirable or undesirable nature.

To communicate to the individual his progress with respect to his educational program, it is especially important to be able to report the progress in meaningful terms. For example, it is much more useful to be able to report to the student that he has learned the English equivalents of 5,000 French words and is able to read stories designed for elementary school children, but will have difficulty with a typical Paris newspaper, than to report that he has reached the 86th percentile in terms of second year norms for high school French.

Some progress has been made in developing assessment procedures for the more difficult objectives, but it will take a large effort over quite a long period of years before very satisfactory procedures are available for assessing all of the outcomes of elementary and secondary education.

A second function of the evaluation program is to determine the effectiveness of the instructional methods and materials. The importance of empirical feedback for improving programs of this type was mentioned in the previous section. In recent years, research and development workers in education and psychology have adopted the words "formative" and "summative" evaluation to differentiate the evaluation used to improve the instructional materials while they are in the process of development from the terminal evaluation of the final product. If instructional materials and methods are to be improved substantially in the next few years, much formative evaluation will have to be done.

The final type of evaluation to be mentioned is in terms of the effectiveness of the educational program in preparing the student for the roles, opportunities, and activities which he engages in as an adult. This type of evaluation is of great relevance and many more studies involving long-range follow-up should be carried out. Insofar as possible, in this, as in all other types of evaluation, systematic efforts should be made to relate specific instructional methods and materials and their objectives with the more ultimate outcomes in terms of effectiveness in the adult role. Only in this way can the educational system anticipate continued improvement in terms of known effectiveness.

Guidance and Individual Planning:
Formulating Goals and Planning Individual Development

In a recent survey of students one year and five years after they graduated from high school, these students were asked to evaluate their high school experience in this study by Flanagan (1966). One item asked

them to complete the sentence, "The main thing I believe I needed which was not provided by this high school was _____." Approximately 25% of the students in each class indicated that "guidance and counseling" was the most important unfilled need in their high school education. This was by far the most frequent response in both classes. The only other comment which was made by an appreciable proportion of the students was "assistance in learning how to study." The other replies were scattered over a wide variety of needs.

Some of the basis for this dissatisfaction with the school's guidance program was shown in the report on the one-year follow-up studies of Project TALENT. In that report by Flanagan and Cooley (1966) it was found, for example, that only 19% of the boys who indicated in the 10th grade they were planning one of thirty occupations as a career reported they had the same plans three years later. Some persons have interpreted the results of these and related studies to indicate that secondary school students are "too young to choose." This implies that counselors, parents, teachers, or others must make their decisions for them. Other writers (Cicourel & Kitsuse, 1963) deplore the fact that the adolescent is forced to make decisions and to declare choices from a range of alternatives he can hardly be expected to know. These writers suggest that school personnel now have control of the access of students to the curricula and therefore over their major life decisions.

In a recent rejoinder to some of these comments and discussion, McDaniels (1968) states, "Youth are not too young to choose, only too poorly prepared to make choices (p. 242)." Although one can sympathize with the 45 year old businessman looking back on his life with some dissatisfaction and regrets who said, "Who gave that 18 year old boy the authority to determine my life?" His quarrel is not primarily that someone else should have made the decision for him, but principally that nobody prepared him in terms of information and skills to make that decision.

In this field also psychologists are embarrassed by the lack of sound principles and data to provide the basis for an effective program. Students are not receiving adequate assistance at the present time even for the relatively limited decisions permitted by the lock-step conventional school organization. The need for choices, decisions, and plans becomes very much greater in a system of individualized education. The research findings required to set up an effective program of guidance and individual planning in an individualized educational system include three types of data:

1. The first type of finding required includes the data essential to assist the student to formulate his life goals. These goals would refer to various possible adult roles and activities with respect to a career, leisure pursuits, and social and citizenship responsibilities. It is assumed that these goals would be in the nature of general directions and would be in a continuous state of development rather than pin-pointed and fixed.

2. The second type of information needed is that required to develop a program for helping the student take responsibility for and plan a developmental program which will enable him to achieve his goals. It is important that he develop skill in planning and decision-making, and that these plans and decisions be based on sound information regarding the alternatives and the probabilities that he can successfully achieve specific objectives included in his plans. The five-year follow-up data from Project TALENT supply some of the required data. However, little information is available as to how to assist a young person to develop skill in making wise decisions and choices using these data and other relevant information.

3. The third area in which information is needed is how to assist students to manage and achieve their planned developmental program. The studies of Skinner (1953), Homme (1966), and Bandura (1964), suggest that it may be possible to assist students to manage their developmental programs by using techniques of reinforcement or contingency management. Although confirmed research findings with respect to the application of some of these

techniques to problems of student development are even more limited than in some of the other areas mentioned, the promise is great and the rewards for an effective program would be of very fundamental importance.

As support for these major functions of an effective program of guidance and individual planning, a number of additional types of information must be obtained. One of these is information on how to communicate an understanding of his personal characteristics including his abilities, interests, and values to an individual in such a way that they provide a sound basis for formulating goals and plans. A discussion of some of the factors involved in transmitting this type of information is given by Berdie (in press). He emphasizes the need for much more specific and experimentally established information in this area.

One of the greatest deficiencies in present educational programs, as pointed out by McDaniels (1968), is the failure to transmit to the student a comprehensive understanding of opportunities, roles, and activities which provide the alternatives from which he must choose. The other specific need is for procedures based on extensive research and development work establishing a program for developing the ability to make sound decisions and plans. Krumboltz (1965), Thoresen (1967), and Tiedeman (1961), have all contributed to defining this area and indicating its importance, but only a beginning has been made on establishing the relations necessary to develop an effective program in this area.

The values of goals and plans in which the individual firmly believes has been repeatedly demonstrated. There are few contributions which psychologists could make to the next generation which would have a greater impact than enabling them to develop realistic plans for individual fulfillment in careers, in leisure activities, and in social and civic responsibilities.

Teacher Development:
Preparing the Teacher for Individualizing Education

In any system of education the focus should be on the individual student. The primary responsibility for helping him set goals, assume responsibility, identify appropriate instructional materials and methods, and monitor his progress is the teacher's. No program for individualizing education can succeed without adequately preparing the teachers for their roles. An excellent discussion of this preparation is provided by Swenson (1962). She stresses the importance of giving teachers an understanding of individual differences and the importance of the teacher's role in guiding learning and controlling the environment for learning.

The preparation of most teachers has included some of the knowledges and understandings required to deal with children as individuals. However, because of the lack of adequate support procedures and appropriate programs, most of the teachers have had very little opportunity to individualize their educational programs in more than a superficial way. Some insights into the research and development problems facing those responsible for the training of teachers for individualizing instruction may be gained from a recent discussion by Gage (1968).

In his discussion of the development of technical skills in teachers through such new procedures as micro-teaching, he listed nine technical skills. These include: (a) establishing set; (b) establishing appropriate frames of reference; (c) achieving closure; (d) using questions; (e) recognizing and obtaining attending behavior; (f) control of participation; (g) providing feedback; (h) employing rewards and punishment; and, (i) setting a model. Although some of these technical skills will apply equally whether the teacher is working in an individualized program or in a conventional classroom setting, there are several of them which would not be appropriate in the individualized setting and there are several others not

included in the list which become of great importance in the individualized instruction setting.

Considerable attention has been devoted to teacher selection, training, and supervision. There are very few published research findings regarding the identification of effective practices in either individualizing instruction or in the usual classroom situation. In the article mentioned, Gage reports the preliminary identification of two specific types of activity which seem to discriminate on cross-validation between teachers who are effective and teachers who are less effective in assisting students to learn the same sets of materials. He terms these two activites, "explaining links" or providing the how, why, or effect of something, and the "rule-example-rule" presentation which involves stating a generalization, giving examples, and summarizing a series of illustrations at a higher level of generality than used in the illustrations. Much more research of this type will be required before we can be confident that we are preparing teachers who will be of maximum assistance to the students in an individualized education program. This is emphasized by the recent findings of Popham (1967) and others that untrained college students and housewives were as effective as teachers in assisting students to learn a specific lesson.

Project PLAN:
Individualizing Education Using the Knowledge Now Available

The foregoing listing of the needs for research and development to plan and carry out an effective program for individualizing education are somewhat staggering. Certainly the things we do not know seem to very greatly exceed those that we do know. However, it does appear that we do know how to assist students to learn better than the programs exemplified by current practice in the schools. Therefore, a number of psychologists and educators have joined with a learning corporation and a number of

school districts in a developmental program to attempt to move one step up the ladder toward the type of individualized educational program that appears possible.

This program, known as Project PLAN (Program for Learning in Accordance with Needs), was tried out in three grades, 1, 5, and 9, with the assistance of 14 cooperating school districts during the past academic year with 2,000 students. This year 4,000 students in grades 1, 2, 5, 6, 9, and 10 will be participating in Project PLAN. Having recited all of the things we don't know about individualizing education, it may be useful to review briefly the preliminary decisions made in establishing this program. As an introduction to these points, the major strategy in initiating the program will be summarized. First, we chose to work within the school setting and closely with school personnel. Second, a comprehensive, rather than a piece-meal approach to the problem was selected. Third, only those school districts who were sufficiently interested and committed to make a substantial contribution in time and funds were included. Fourth, a team of behavioral scientists with long experience in the application of research and development to practical problems was assembled. Fifth, plans for the program from the outset included the evaluation of each aspect of the program in terms of the assessment of the results with the students. And sixth, the developmental program was scheduled over a several year period with a clear indication at the outset that initial progress could be expected to be slow and difficult.

The major decisions made with respect to the five points discussed above including educational objectives, learning methods and materials, evaluation, guidance and individual planning, and teacher development are reported briefly below.

1. Educational objectives. With respect to educational objectives, Project PLAN has developed comprehensive lists for grades 1 to 12 which reflect current thought and practice. These lists have been prepared in the

four subject matter areas of language arts, social studies, science, and mathematics. They are based on the reports of various committees which have been studying the curriculum in connection with new government sponsored developmental programs in these areas and on the available instructional materials.

It is intended that each Project PLAN student select his own educational objectives with the help of his teacher. For the present these are restricted to objectives for which instructional materials are available. It is expected that as better information becomes available about the educational objectives of most value to students with specific ambitions in terms of life goals and activities, it will be possible to develop new instructional materials to permit the student to achieve these objectives efficiently.

In Project PLAN about five objectives are grouped together in a module. Each of the objectives is intended to require two to three hours to achieve, and thus the module is intended as approximately a two week segment of instruction.

2. Learning methods and materials. As indicated above, it was decided that Project PLAN should begin with available instructional materials and media. To provide the necessary flexibility for individualizing education, several teaching-learning units are provided for each module. A teaching-learning unit is a four page guide which lists each objectives along with the materials to be used by the student in attaining this objective. An effort has been made to provide for individual differences in terms of interests and learning styles by presenting several alternate routes to achieve the same objectives. The various teaching-learning units make varying use of audio-visual media and capitalize on such differences as there are in the instructional methods used by different authors and publishers.

An important aspect of this program is the evaluation of the effectiveness of the various instructional methods and materials in terms of

learners with known characteristics. By dividing the instructional program into manageable segments of these types, it is possible to vary the time spent on objectives. A person might complete as few as 12 modules, or as many as 24 modules in a year in a particular subject. Also, the procedure makes possible at least a limited adaptation of the individual's learning style to an available instructional program. Finally, the modules permit tailoring the curriculum for each student to his short-range and long-range objectives and requirements.

3. Evaluation. The program of monitoring and evaluating Project PLAN is accomplished with two main types of assessment materials. The first type includes specific test questions focused on the achievement of the objectives in a particular module. These questions, or alternate forms of them, are also used in placement and survey tests. They are intended to indicate mastery of the stated objective.

The second type of assessment procedure is designed to measure a long-term objective. An example of one of the most important objectives of this type is reading comprehension. Other objectives of this type would include attitudes, appreciations, originality, and other important skills and abilities which require more than two weeks to develop.

Procedures other than pencil and paper tests are used, particularly to assess some of the long-term objectives of the program.

4. Guidance and individual planning. The guidance and individual planning program of Project PLAN represents a major developmental effort in this educational system. Two factors have led to this emphasis: First, the conviction that individual planning must be a central function in a program for individualizing education; and, second, the newly available data from Project TALENT students given a comprehensive set of tests and followed-up five years after they had completed their high school courses. These data provide a solid foundation on which to build a career planning program. The Project PLAN program is focused on assisting each student to formulate his

goals in terms of adult opportunities, roles, and activities; to take responsibility for and plan a developmental program to achieve these goals; and to learn to manage his own developmental program to carry out these plans.

The Project PLAN guidance and individual planning program consists of four major components. The first two are primarily related to information and concepts and their interpretation. And the second two are more specific skills and abilities for planning and carrying out the individual's development based on the knowledge presented in the first two components.

(a) The first component is a program for acquainting each individual with the status of his development with respect to abilities, interests, physical and social characteristics and values in the areas of education, vocations, social behaviors, citizenship, and the use of leisure time. This program should include developing an understanding of individual differences during childhood, adolescence, and maturity and the basic principles of learning. In this program it is proposed to substitute for the concepts of intelligence and aptitudes, the slightly different concept of developed abilities. The concepts of aptitude and intelligence connote abilities which are too fixed and unchangeable. The concept of developed abilities is given a much more controllable quality. The individual would be informed of the level of development of his abilities in statements having direct meaning such as the number of words he understands from among those listed in Webster's Collegiate Dictionary. Or, his ability to read might be reported in terms of the types of materials he can read with a defined level of comprehension, for example, the type of text book or newspaper or news magazine which he understands.

In interpreting the student's score on reading comprehension the student would be told that the average gain in reading comprehension on this particular test of developed ability in reading comprehension was 6 points. It could be pointed out that his chances of being admitted to an

engineering program in a university and completing this program would be less than 10 in 100 if his gain during the next three years was only 6 points. On the other hand, if he were able to increase this gain to 12 points, his chances of success would be increased to 50 in 100. Information could also be supplied to the student on the frequency with which gains of this size have occured. This type of interpretation will be discussed in terms of planning and decision-making skills.

(b) The second component consists of a program to familiarize the student with the variety of opportunities, roles, and activities in the world of work, in social and civic relations, and in cultural, recreational, and other leisure time pursuits. This information includes the educational requirements for various occupations, the competencies in terms of developed abilities required for admission and success in these occupations, and the conditions and importance of each of the various roles. Similar types of information would be provided with respect to the other types of adult activities for which the student might wish to prepare himself.

(c) The third component is a program to assist each student to formulate his long-term goals and to take the responsibility for and plan a developmental program to achieve these goals. Each individual would be assisted in relating his personal potentials for developing abilities, his interests, and his values with opportunities likely to be available to him. The program would include substantial training in decision-making and problem-solving. One procedure which will be used extensively is to give the student practice in making decisions and plans for other students on the basis of their Project TALENT information. The decisions and plans made for the student would then be compared with the experience of this student in real life. This training is being formalized in a career game which would ask the student to make a series of decisions for a specific person with known characteristics. These decisions would cover a period of 10 or 15 years in the life of the hypothetical person whose career was

being planned, but would be made on the basis of periodic feedback in just a few weeks by the person being trained in planning and decision-making. Feedback would be provided based on Project TALENT data in the same way as in the usual simulation and business games. Only after the individual has shown considerable competence in making plans for these other students which are appropriate and in accordance with their goals and abilities would he be asked to make decisions having to do with his own development.

(d) The last component in the guidance program is a set of procedures designed to assist the student in learning to manage his own development. This development would be defined in terms of his goals and plans. It is proposed that one of the inputs to this program would be the record of critical incidents observed by the teacher which defines certain areas needing improvement in behavior. It is anticipated that at least some students will be able to learn to carry out a program of reinforcement of desirable behaviors which will correct their behavioral patterns in those areas in which improvement is needed. Other students will require more direct assistance from teachers, counselors, and parents in managing their development programs.

5. Teacher development. The teacher development program of Project PLAN consists of two parts. The first part is a three day individualized program which uses modules, teaching-learning units, objectives, and tests. To achieve these objectives, extensive use is made of motion pictures and video tapes. In using the motion pictures and video tapes, there is considerable emphasis on modeling for the teacher and actual practice by the teacher of the skills found to be most important in individualizing education along the lines of Project PLAN. This practice is recorded on video tape and critiqued to improve the teacher's performance. The second phase of the teacher development program is the in-service training program. This consists of the identification of problems, the

discussion and development of solutions, and the additional use of modeling and practice techniques to develop effective behavior patterns during the school year.

Conclusion

In concluding this discussion, it seems appropriate to mention that we do use a computer in Project PLAN. The function of the computer is simply to perform clerical and statistical activities of a teacher-support nature. These activities include test scoring, preparing records, filing, matching characteristics, and estimating probabilities. The program could function without a computer, but it would be more expensive and less responsive. The Project PLAN system is an adaptive system in the sense that the response of the system is modified by the nature of the input. In Project PLAN, in any given subject, inputs and adaptive responses occur at only two week intervals in any subject. It is the belief of the group working on Project PLAN that an adaptive system is essential, but that modification of the instructional program at two week intervals probably provides sufficient external monitoring. The teacher and student, of course, are expected to be responsive in an adaptive way to student behavior in the interim period.

Comparing the modest objectives of Project PLAN with the enormous task facing psychologists in improving education on the basis of valid research evidence, it seems like a small beginning. To succeed in the major task will require the active participation of many hundreds of psychological researchers. It is hoped that both the trained psychologists and the required support can be found to make the needed rapid progress on this very important problem in the next few years.

References

Atkin, J. M. Behavioral objectives in curriculum design: A cautionary note. The Science Teacher, 1968, 35(5), 27-30.

Ayres, L. P. Laggards in our schools, a study of retardation and elimination in city school systems. New York: Russell Sage Foundation, 1909.

Bandura, A., & Kupers, C. J. Transmission of patterns of self-reinforcement through modeling. Journal of Abnormal and Social Psychology, 1964, 69, 1-9.

Beard, J. G. Adapting instruction to student characteristics. Paper presented at the Conference of Directors of State Testing Programs, Princeton, New Jersey, October 1967.

Berdie, R. F. The uses of evaluation in guidance. In National Society for the Study of Education. Yearbook, 1969, 68, in press.

Briggs, L. J. Sequencing of instruction in relation to hierarchies of competence. American Institutes for Research Monograph, 1968, No. 3.

Briggs, L. J., Campeau, P. L., Gagne, R. M., & May, M.A. Instructional media: A procedure for the design of multi-media instruction, a critical review of research, and suggestions for future research. American Institutes for Research Monograph, 1967, No. 2.

Carroll, J. B. Instructional methods and individual differences. In R. M. Gagné (Ed.), Learning and individual differences. Columbus, Ohio: Charles E. Merrill Books, 1967.

Carroll, J. B. On learning from being told. Educational Psychologist, 1968, 5(2), 1, 5-10.

Carter, L. F. Knowledge production and utilization in contemporary organizations. In T. L. Eidell & J. M. Kitchel (Eds.), Knowledge production and utilization in educational administration. Eugene, Oregon: University of Oregon, Center for the Advanced Study of Educational Administration, 1968.

Cicourel, A. V., & Kitsuse, J. I. The educational decision-makers. Indianapolis: Bobbs-Merrill, 1963.

Committee for Economic Development, Research and Policy Committee. Innovation in education: New directions for the American School. New York: CED, 1968.

Cronbach, L. J. How can instruction be adapted to individual differences. In R. M. Gagné (Ed.), Learning and individual differences. Columbus, Ohio: Charles E. Merrill Books, 1967.

Dyer, H. S., & Hemphill, J. K. A plan for evaluating the quality of educational programs in Pennsylvania; a report from Educational Testing Service to the State Board of Education, June 30, 1965. Princeton, New Jersey: Educational Testing Service, 1965.

Flanagan, J. C. The critical incident technique. Psychological Bulletin, 1954, 51, 327-358.

Flanagan, J. C. A survey of the educational program of the Hicksville public schools. Pittsburgh: American Institutes for Research, 1966.

Flanagan, J. C. Using research and development to improve education. Paper presented at the meeting of the American Educational Research Association, New York, 1967.

Flanagan, J. C., & Cooley, W. W. Project TALENT one-year follow-up studies. Cooperative Research Project No. 2333, United States Office of Education. Pittsburgh: University of Pittsburgh, 1966.

Flanagan, J. C., Dailey, J. T., Davis, F. B., Goldberg, I., Neyman, C. A., Jr., Orr, D. B., & Shaycoft, M. F. The American high-school student. Cooperative Research Project No. 635, United States Office of Education. Pittsburgh: University of Pittsburgh, 1964.

Gage, N. L. An analytical approach to research on instructional methods. Phi Delta Kappan, 1968, 49, 601-606.

Gagné, R. M. Conditions of learning. New York: Holt, 1965.

Gagné, R. M. Contributions of learning to human development. Psychological Review, 1968, 75, 177-191.

Gardner, J. W. The ten commitments. Saturday Review, 1967, 50(26), 39-40.

Goodlad, J. L, & Anderson, R. H. The nongraded elementary school. (Rev. ed.) New York: Harcourt, Brace & World, 1963.

Homme, L. Contingency management. Newsletter of the Section on Clinical Child Psychology, Division of Clinical Psychology, American Psychological Association, 1966, 5(4).

Kropp, R. P., & others. Identification and definition of subject-matter content variables related to human aptitudes. Cooperative Research Project No. 2914-1, January 1967, Florida State University, Contract OEC-5-10-297, United States Office of Education.

Krumboltz, J. D. Behavioral counseling: Rationale and research. Personnel and Guidance Journal, 1965, 44, 383-387.

Lange, P. C. Media and the learning process. Audiovisual instruction, 1968, 13, 554-557.

Mager, R. F. Preparing instructional objectives. Palo Alto, Calif.: Fearon Publishers, 1962.

Markle, D. G. The development of the Bell System first aid and personal safety course. Palo Alto, Calif.: American Institutes for Research, 1967.

Maslow, A. H. Motivation and personality. New York: Harper, 1954.

McDaniels, C. Youth: Too young to choose? Vocational Guidance Quarterly, 1968, 16, 242-249.

Popham, W. J. Development of a performance test of teaching proficiency. Final Report No. BR-5-0566, August 1967, University of California, Los Angeles, Contract OEC-6-10-254, United States Office of Education.

Reavis, W. C. Differentiated requirements in the University of Chicago High School. In National Society for the Study of Education. Adapting The schools to individual differences. Twenty-fourth Yearbook, Part II, 1925, 49-52.

Scriven, M. The methodology of evaluation. In R. W. Tyler, R. M. Gagne, & M. Scriven, Perspectives of curriculum evaluation. American Educational Research Association Monograph Series on Curriculum Evaluation, No. 1. Chicago: Rand McNally, 1967.

Short, J., Garee, M. K., Kress, G. C., Jr., & O'Brien, R. K. A study of a training system for advanced AT&T salesmen. Pittsburgh: American Institutes for Research, 1968.

Skinner, B. F. Science and human behavior. New York: Macmillan, 1953.

Swenson, E. J. Teacher Preparation. In National Society for the Study of Education. Individualizing Instruction. Sixty-first Yearbook, Part I, 1962, 287-304.

Tallmadge, G. K., Shearer, J. W., & Greenberg, A. M. Study of training equipment and individual differences: The effects of subject matter variables. Technical Report NAVTRADEVCEN 67-C-0114-1, May 1968, American Institutes for Research, Contract No. N61339-67-C-0114, United States Naval Training Device Center.

Thoresen, C. E., & Mehrens, W. A. Decision theory and vocational counseling: Important concepts and questions. Personnel and Guidance Journal, 1967, 46, 165-172.

Thorndike, E. L. The elimination of pupils from school. United States Bureau of Education. Bulletin, 1907, No. 4.

Tiedeman, D. V. Decision and vocational development: A paradigm and its implications. Personnel and Guidance Journal, 1961, 40, 15-21.

Travers, R. M. W. Models of education and their implications for the conduct of evaluation studies. Paper presented at the meeting of the American Educational Research Association, Chicago, February 1968.

Tyler, R. W. The functions of measurement in improving instruction. In E. F. Lindquist (Ed.), Educational measurement. Washington: American Council on Education, 1951.

Tyler, R. W. The objectives and plans for a national assessment of educational progress. Journal of Educational Measurement, 1966, 3, 1-4.

United States President's Commission on National Goals. Goals for Americans; programs for action in the sixties. Englewood Cliffs, New Jersey: Prentice-Hall, 1960.

Washburne, C. W. Burk's individual system as developed at Winnetka. In National Society for the Study of Education. Adapting the schools to individual differences. Twenty-fourth Yearbook, Part II, 1925, 77-82.

Wilhelms, F. T. The curriculum and individual differences. In National Society for the Study of Education. Individualizing Instruction. Sixty-first Yearbook, Part I, 1962, 62-74.

Woodworth, R. S., & Thorndike, E. L. The influence of improvement in one mental function upon the efficiency of other functions. Psychological Review, 1901, 8, 247-261, 384-395, 553-564.